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ABSTRACT

This chapter discusses the foundations of instructional development and analyzes the development of various models, paradigms, archetypes, and themata used to describe instructional development. Two key strands in the literature of instructional development--instructional efficiency ("doing the right things") and instructional effectiveness ("doing the things right")--are described. Objective and subjective paradigms are then considered, as well as three archetypes of instructional development: the audiovisual, engineering, and problem-solving archetypes. In conclusion, it is argued that instructional development should be viewed not as a process, but as a set of criteria to which the technologies of the field must contribute. Two figures are included. (30 references) (Author/EW)

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A. METATHEORY

Chapter 2

Instructional Development: Themata, Archetypes, Paradigms and Models

Ivor Davies

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What is the nature of instructional development? Is it a science, an art, or a combination? Is its structure that of other fields, or is this structure unique? What are the distinguishing characteristics of ID? If we are to "do" ID, perhaps we should know what it is. If so, the present article should be of great value.

"Lord Ronald...flung himself upon
his horse and rode off madly in all
directions."

Stephen Leacock:
Gertrude the Governess

Like Lord Ronald, instructional developers have tended to run off madly in all directions. The range and seriousness of the problems facing education and training, coupled with the promise provided by instructional development, has tempted developers. In an effort to be useful, instructional developers have evolved a wealth of techniques without providing a corresponding richness in their underlying theory.

The nature of instructional development is a matter of concern. At various times, developers, or groups of developers, have conceived of the endeavor in different terms. Some see it as an art, others as a craft, and still others as a science (see Coscarelli, 1981). The notion of a technology still runs deeply, and may well lie at the heart of the matter. Indeed, many of the so-called models of instructional development address the notion of technology more than they define the nature of the activity itself.

TECHNOLOGY AND METHODOLOGY

The word "technology" means different things to different people. Far from assisting in the dissemination of instructional development, use of the word "technology" has sometimes become something of a barrier to its acceptance and understanding. For many people, the term implies machines of one type or another. It suggests an orientation that seeks to de-humanize education and training, relegating people to a subservient role. Teaching machines of the 1960s, and now computer terminals in the 1980s, have seemed for some to be the solution to all educational problems.

The association of machines with the word "technology," however, is of relatively recent origin. It is an association that began with the Great Exhibition, the showcase of the Industrial Revolution, in the Crystal Palace in 1851. The older and richer meaning, though, is concerned with know-how, the fruits of knowledge combined with experience. In such usage, instructional development takes on a humane and significant connotation. Variety is expected, for human experience and knowledge are boundless. Know-how fuels the skills of technology, but methodology

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supplies the bond.

The range for action in instructional development, viewed as a technology, is vast. Problems abound, and opportunities are limitless. Nevertheless, developers tend to work along more or less parallel paths when they seek to design, produce and evaluate instructional environments in order to meet specific instructional needs. Methodology, in other words, constitutes a common factor among instructional developers at large.

Although developers may well describe their field differently, and although their training, background and experiences may be varied, their common methodology gives the field integrity. Needs analysis, identification of objectives, task analysis and learner analysis are all parts of the methodology of instructional development. But they do not define the field, any more than sawing, planing, chiseling, shaping, hammering and finishing define the field of carpentry. The nature and scope of instructional development remains hidden when only techniques are discussed.

Progress will only take place if the field, as a whole, is discussed and debated. As with so many things, the whole is so much greater than the sum of the parts. The nature of instructional development is a research problem, as is the nature of geography (see Hartshorne, 1951) or the nature of literary criticism (see Frye, 1957). It is important to examine a field as scholars have worked within it and conceived of it. Only then will it be possible to answer such questions as:

- What is instructional development, and what are its characteristics?
- Does instructional development have integrity, and what is its logical position among the different fields of human endeavor?
- What are the major problems of instructional development, and how may the activities of developers be made more significant?

Such questioning portrays the emergence of instructional development as a mature field.

INSTRUCTIONAL DEVELOPMENT AS EFFICIENCY AND EFFECTIVENESS

Two threads run through the literature of instructional development. One involves efficiency, and the other effectiveness. In a very real sense, they have become the two goals to which developers strive, and by which their results are measured. Yet the two terms are often used without a full appreciation of what the words mean, or what is implied by the distinction between them.

Indeed, efficiency has become something of a cult among instructional developers, partly due, perhaps, to the many fiscal problems facing educa-

tional and training agencies worldwide. Such a value has further reinforced an emphasis on systematic* methods of development, and nurtured a tendency to freeze methodologies and techniques in a fixed form. The "one best way" approach has often reduced creative ideas to cookbook-like recipes, and promising heuristics to algorithms.

There has been a great deal of discussion, for instance, on the best way of writing objectives, and too little on alternative ways of mapping them (see Davies, 1967). There has been some debate on how media should be selected, but little on alternative ways of integrating media (projected and non-projected) into course content and learner experiences. As a result of this type of myopia, alternative ways of proceeding have been overlooked, and creative ways of proceeding have been short-changed.

Peter Drucker (1967) put the matter rather well when he wrote:

"Intelligence, imagination and knowledge are essential resources, but only effectiveness converts them into results. By themselves, they only set limits to what can be attained."

Effectiveness is the ultimate goal of instructional development, but creativity, too, has an essential role. Art and craft provide the life-forces which animate the technology.

Role of Efficiency

Efficiency is concerned with doing things right, with doing things correctly. See Figure 2-1. Efficiency is important, and its presence is usually obvious. Most of us can recognize efficient development, just as we can recognize efficient teachers and instructors. Certain things have to be attended to, both in development and in instructional situations. The learning task, for instance, should be relevant and worthwhile. Objectives should be clearly communicated and expectations understood. Materials should be well written and well designed. So it goes on.

The important thing is that efficiency implies a sense of direction and good organization. Instructional development must be concerned with efficiency, and developers should be commended for their contributions to it. However, efficiency does not imply effectiveness, as will be made clear below.

*The words "systematic" and "systemic" come from different roots. The former from the Latin, with a nuance of order or interval; and the latter from the Greek, with a nuance of organized whole. In instructional development the term system is often used to characterize an approach, when systematic is implied. (See Davies, 1981b).

10 II. Strategies. A. Meta-Theory

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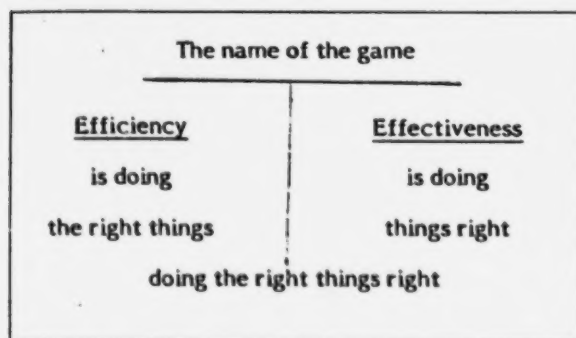


Figure 2-1. Efficiency and effectiveness in instructional development.

The Role of Effectiveness

Effectiveness is concerned with doing the right things, with the things that need to be done. It is a function of what developers do. It is a measure of the extent to which they realize their several responsibilities. If developers fail to manage development properly, so that learners fail to achieve required levels of mastery, then instructional development has been ineffective--no matter how efficient it might be.

Effectiveness is judged by what is accomplished. Although efficiency may contribute to effectiveness, it does not guarantee it. Effectiveness, though, is what instructional development is really about. It involves taking account of both the needs of the task and the needs of the learners involved. Both sets of needs, people and task, have to be met and harmonized. Sometimes one set of needs are more important than the other. Usually, however, both are important and both must be taken into account. Effectiveness is the central issue of instructional development (Davies, 1972; 1973), as well as the ultimate goal of its methodology.

Skills of Effectiveness

In order to be effective, developers must make effective decisions. Learning needs must be identified, resources arranged, methods chosen, motivation harnessed, progress monitored, and plans for improvement implemented. These are time-consuming tasks for developers to undertake. Yet they are essential ones, if effectiveness is to be obtained.

Four prime skills are involved with effective development. Developers who seek effectiveness need to be:

- Sensitive

This means sensitive to the needs of the task and sensitive to the needs of the learners who must accomplish that task.

- Diagnosticians

This means being able to determine what is required, and what needs to be done if mastery is to be achieved.

- Decision-makers

This means choosing optimal designs for learning and then putting them into effect without passing up unplanned opportunities.

- Flexible

This means implementing what the learning situation requires, and varying development plans accordingly.

All of this, of course, requires dedication and skill. Above all it involves a clear understanding of where time goes. Effort must be geared to results. Effectiveness also requires that development build upon people's strengths, not upon their weaknesses.

Making Effective Decisions

Effectiveness also involves making the right decisions. Sometimes decisions are easy, sometimes they are routine. At other times, ID decisions are demanding, and require a great deal of thought and exploration of creative alternatives. There is no best way in development, and there is rarely any best decision.

A decision is a choice between a number of competing alternatives. Rarely is it a choice between what is right and what is wrong. More usually, in instructional development, it is a choice between a number of options, all of which have advantages and disadvantages for the situation in hand. As Peter Drucker (1967) suggests, a decision is:

"...at best a choice between 'almost right' and 'almost wrong'--but much more often a choice between two courses of action neither of which is probably more nearly right than the other."

For this reason alone, instructional development requires a great deal of sensitivity and flexibility, as well as analytical activity of a high order. A decision in one instructional situation is not necessarily a precedent for another.

The Essential Themata of Instructional Development

In a very real sense, all instructional development activity represents so many "case studies." Cases that are specific to a particular time and place, to a specific set of task and people needs. Such cases, however, are woven around two common strands of thought. Both strands need to be taken seriously by instructional developers as they reflect upon their craft. They involve, first, certain basic themes or "themata," and second, essential "archetypes" or ways of looking at things.

The term "themata" identifies certain themes that run through and across the literature of instructional development. These themata provide self-explanatory insights into the activities of developers, as well as a bridge over areas of ignorance. In effect, they are believable propositions, which are difficult to corroborate or refute (see Holton, 1973). As such, themata have a strong hold over the minds of instructional developers, showing great persistence throughout the literature.

Among the primary themata of instructional development are the recurring themes of "technology," "systematic approach," and "systems thinking." Also included are the dual themata of "efficiency and effectiveness." In many ways, such characteristic activities or technological concerns as "needs analysis," "task analysis," "learner analysis," "design and development" and "evaluation" have taken on the role of themata in the thinking of instructional developers. (Davies, 1981 d).

In the newer sciences, Holton (1973) argues, the underlying themata are more obvious. They tend to be discussed with great freedom whenever any attempt is made to define these sciences in terms of domains of human activity. Furthermore, such themata are used as a basis for decision-making. These characteristics aptly describe what has happened in instructional development over the last two decades, although a subtle change has occurred in the last five years or so.

Although such themata still characterize thought in instructional development, they are taken much more for granted and are rarely discussed in any depth. It is as if they have blended into tradition, particularly as more and more ID decisions are made upon theoretical and empirical grounds. Holton regards such a shift as an indication of maturity. In such a stage, the idea of rejecting fundamental themata would be seen as "paradoxical, ridiculous, or outrageous." This is how any suggestion to abandon objectives or evaluation would be described in 1983!

ARCHETYPES, PARADIGMS AND MODELS IN INSTRUCTIONAL DEVELOPMENT

As in any area of disciplined inquiry, instructional developers do not theorize in a vacuum. The ways in which problems are stated, themata readied, and principles and concepts used provide a

starting point for theorizing. Empirical data, assumptions and specific techniques are also used to illuminate the situation, as well as to suggest a range of appropriate strategies and tactics.

Other factors, as Phillips (1971) points out, also influence theorizing. Such factors as simplicity, robustness, elegance and sophistication are important. So is coherence with established theories in education and training, as well as in instructional development itself. In other words, instructional developers always have a theory. Sometimes it may be crude, at other times highly sophisticated. Yet theory, regardless of its character, shapes the way a situation is perceived. It also influences the values that surround it.

Two terms are often used in the general literature dealing with disciplined acts of inquiry. They are "archetype" and "paradigm." Since the term "model" is often used in the literature of instructional development, usually with little or no real precision, it is also important to consider what is being suggested when that term is used.

An Archetype

The general viewpoint or perspective used by someone engaged in an act of inquiry is technically referred to as an "archetype" or "root metaphor." It acts as a loose theoretical framework or prototype; a primordial image or pattern, as it were, which constantly recurs in professional thinking. Archetypes are usually internally consistent enough to be considered as universal principles or heuristics for thought and action.

The term was first used in English around the year 1605. It is part of the vocabulary of historians, anthropologists and psychologists. Jung (1922), for instance, used the term in the context of a "primordial image," a "psyche residue," which constantly repeats itself throughout human experience. Unlike themata, however, which are free of a particular theoretical position, archetypes serve to bind together loose classes of assumptions into the nucleus of a theory.

Frazer (1871), in *The Golden Bough*, uses the term to trace particular elemental patterns of myth and ritual which recur in the legends and ceremonials of diverse cultures. The term has also been used by Robert Graves, Wilson Knight and Northrop Frye in the context of literary criticism. They use it to identify narrative designs, character types and certain images which appear over a wide range of writings.

The term "archetype" is also meaningful in the context of instructional development. It usefully identifies myths, dreams and ritualized modes of professional conduct which--rather than be seen for what they are--have often been taken for what they are not. They hold recognizable professional groups together, as well as anchor informal networks and clusters of instructional developers. Archetypes offer developers a basic set of assumptions, a language of belief, and a set of valued activities. Usually they are captured by slogans,

such as "Help stamp out non-behavioral objectives," or metaphors, such as relating development to a craft.

A Paradigm

An archetype can give rise to a number of different paradigms. Usually, though, only one paradigm is involved, although it may be presented in varying degrees of detail or complexity. In essence, a paradigm is a more concrete conceptualization of an underlying idea or theory. It involves definitions, statements and interrelationships. The archetype has been refined, so that a coherent tradition of research and practice is possible.

Paradigms are usually qualitative in nature. They may be expressed in words, in numbers, or in a visual display. In instructional development, a diagram illustrating important relationships by means of boxes and arrows is often used. In this way, a unique description of ID is portrayed. Underlying methodologies are indicated and research questions worthy of further study are suggested. Paradigms are often used to help account for events previously difficult to explain.

Unlike an archetype, a paradigm rarely represents a dramatically new orientation. Nor does it attempt to offer a "world-view" or wide, embracing perspective. It is much too limited and applied for that to occur. However, as in instructional development, a particular paradigm can be recognized in two important ways:

- The paradigm is sufficiently novel and appealing to attract an enduring group of adherents away from competing schools of thought or action. The engineering paradigm in instructional development, for instance, has attracted many people who would formerly have described themselves as media-oriented.
- The paradigm is sufficiently open-ended to allow adherents to pursue all sorts of problems in a manner that allows them to refine and define further the details of the basic paradigm for themselves. This is characteristic of what is currently happening in instructional development. Such recruitment is giving new life and vigor to ID.

It can safely be assumed that when a small group of developers work together, their shared values and concerns indicate a shared paradigm of one kind or another. Such a paradigm acts as a cohesive binding for their work (see Mullins, 1973).

Once a paradigm or series of paradigms have been proposed, details and ambiguities must still be identified and resolved. These will commonly result in different variations of the same paradigm. The basic principles remain, but the emphases, priorities and particulars change. Indeed, the num-

ber of variations can be endless. New paradigms, in fact, can be mistakenly proposed, when nothing more than a variation is involved. Indeed, the paradigms currently espoused in instructional development are worryingly limited, although the variations are many.

A Model

The literature of instructional development seems especially rich in models. However, in the context of the preceding discussion, many of them are technically paradigms. A model usually has a quantitative dimension. It is a much more specific and detailed representation of reality.

A child's model car, for instance, usually bears a quantitative relationship to the real thing. The distance between the rear wheels on the model can be used to calculate the distance between the wheels on the original. In a similar way, a model in science bears a quantitative relationship to reality. A map is a model, for distances on the map represent distances on the ground. Similarly, a mathematical equation is a model, as is a photograph. Simulators are models, too.

The idea of modeling is hardly new. Early astronomers constructed models of the universe as they conceived of it. Engineers made models of the bridges and aqueducts which they designed. Architects, too, have long made models of the towns they have planned and the buildings they have designed. What is new is the recognition that is currently being given to model-building as a creative act of inquiry. The extent to which models are currently employed as a basis for intellectual activity is also relatively novel.

Three main reasons have been suggested for the growth of model building in research and development, as well as their ready acceptance (Starr, 1971). First, the deliberate manipulation of people and organizations in research is questionable, and in some cases unlawful. Second, the amount of uncertainty with which professional people have to deal has been increasing rapidly. Mistakes are more likely, while the costs (human and financial) associated with them are increasing at an alarming rate. Finally, as a result of developments in operations research, our ability to build models which are good representations of reality has improved to such an extent that there has been increased interest in them and increased confidence in their usefulness.

The ultimate destiny of a paradigm, from a theoretical viewpoint, is falsification. Only by falsifying it can it be replaced with a more accurate and useful portrayal. On the other hand, the ultimate destiny of a model is verification. Only by demonstrating that it represents reality can its use be justified in the solution of a specific problem.

Models, of course, are specific to particular phenomena. Quite different models, however, may represent an identical set of phenomena examined

from quite different paradigmatic points of view. It is quite possible, for instance, to model stress in terms of a person's response to disturbing or noxious instructional environments. Stress can also be modeled in terms of the stimulus characteristics of such environments. Finally, stress can be modeled as a lack of 'fit' between a person and the environment. The important property of a paradigm lies in its suggestive power. The importance of a model, on the other hand, lies in the manner in which it is possible to formulate associated hypotheses that can be tested.

Three criteria can be identified for a model (Keeble, 1967). A model should:

- Single out crucial variables.
- Define concepts precisely enough to permit comparison with the real world.
- Possess an analytical rather than a descriptive framework.

In instructional development, few models meet these minimal criteria. Most are purely descriptive; few of the concepts permit comparison; and fewer still single out significant variables for inclusion in a testable hypothesis.

In instructional development, few models--with the possible exception of Aptitude-Treatment-Interactions (ATIs) and certain motivational theories--have been rigorously tested. Indeed many empirical investigations seem to take place, without reference to underlying theory. Instead, the field tends to be overly characterized by many small pieces of self-contained research. Such studies are difficult to synthesize within a coherent framework which would be useful as a guide to future action. Fortunately, several attempts have been made at supplying a coherent framework during the last few years (Hartley & Davies, 1976 & 1978; see also Ladas, 1980), but many more are still needed.

OBJECTIVE AND SUBJECTIVE PARADIGMS IN INSTRUCTIONAL DEVELOPMENT

For many, the concept of instructional development implies a systematic approach to learning "in which one tries to develop means to achieve given ends and persists in one's attempts to find solutions to problems" (MacKenzie, Eraut & Jones, 1976). The most common archetype is the engineering one, and the associated paradigms are heavily biased towards the kinds of objectivity which have traditionally been valued in science as it is normally perceived (see Kuhn, 1970). This has led to a suspicion among many developers that the notion of objectivity is the only paradigm possible in instructional development. It is as if perception, consensually validated, is the only professionally acceptable way of knowing and understanding reality.

Yet an alternative is available. It is a

particularly rich one for instructional development. It involves the notion that there is also a subjective paradigm (Bleich, 1978), and that both objectivity and subjectivity are assumptions to be tested. The very process of observation, in educational or training contexts, interferes with what is being observed. As in any situation, the phenomena observed are changed by the very act of observation.

Eddington (see Heisenberg, 1958) put the matter dramatically when he wrote:

"We have found that where science has progressed the farthest, the mind has but regained from nature that which the mind put into nature. We have found a strange footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the footprint. And lo! It is our own."

There is, indeed, a limit to objectivity, and that knowledge leads back to the developers who are actively engaged in acts of inquiry. Problems are solved by people. However, the data which they collect is contaminated by the developers making the observations, analyses and evaluations.

A great deal of the current concern in ID with morality and ethical matters can be viewed as a direct contribution from the subjective paradigm. Poole (1972), for instance, argues that since "the body is the locus of all ethical experience, all experience is, because spatial, ethical. There can be no act which does not take place in ethical space. There can be no 'flaccid' act, no act devoid of all significance, no un-conditioned act." Knowledge and responsibility, in other words, are both aspects of the subjective paradigm; the one permeates the other.

Ethical concerns have little or no role in the world of the objective paradigm. Such a thought is of particular importance for instructional development, since the antecedents of so many of its themata and methods are clearly discernible in the principles of behaviorism. The very advantages of behaviorism, viewed from the perspective of the subjective paradigm, raise important ethical questions for ID. Dogmatism and skepticism, however, are human failings which are associated with both paradigms. At the very end, developers are still faced with the problem of making decisions based upon both quantitative and qualitative information. Appropriateness is the key issue, as is flexibility.

THREE ARCHETYPES AND THREE PARADIGMS OF INSTRUCTIONAL DEVELOPMENT

In the light of the preceding discussion, it is possible to discern three archetypes in the literature of instructional development. The first arche-

type is an audio-visual one. Although it was initially developed in the media field during the 1930s, it became particularly important in the years following the Second World War. To a certain extent, it is still evident in the writings of some developers to this day.

The second archetype is an engineering one. It came into prominence with the emerging interest in programmed instruction in the early 1960s. To a very large extent, it still characterizes much of the field of instructional development. The third and final archetype is a problem-solving one. It is related to the creative process, as well as to a systemic way of looking at things. This archetype is currently emerging, both in the United States and in Europe, as the focal-point of the more creative developmental activities.

Each one of these archetypes has led to the development of a series of related paradigms. Although more than one paradigm has developed for each of the "root metaphors," the differences are in detail rather than in substance. Accordingly, it is possible to indicate the major concerns and development procedures by looking at one paradigm for each of the three archetypes.

For the sake of illustration, a metaphor is used for each paradigm in order to indicate the flavor of the underlying thinking. As with all figurative language, the metaphor should not be taken literally, nor even seriously. Figure 2-2 illustrates both the three paradigms of instructional development and their associated metaphors. In each case, additional detail could have been added to the diagrams. The aim, however, has not been to be as exhaustive as possible; instead, an attempt has been made to indicate the major thrust of each one of the three contrasting approaches.

The Audio-Visual Archetype

The Audio-Visual archetype predates the other two archetypes of instructional development. This, perhaps, explains why media departments in so many universities have associated with them, as an apparent anomaly, instructional development responsibilities. The metaphor commonly associated is one of the gum-ball machine. An investment is made, and what is obtained in return bears some relationship to what is desired. So it is with the associated paradigm, although investment does not always equate with return.

Instructional development, often in this context called educational technology, has five broad purposes. It assists in classroom presentations. Additionally, it helps improve both the efficiency and effectiveness of a wide range of demonstrations, by bringing into the classroom experiences normally unavailable to learners. The archetype also helps solve many of the problems of distance-teaching (as in the use of radio, television, films, sound cassettes, and the mail services) by enabling teachers to deal with learners located in different parts of a state or country. Instructional development is also seen as a means of enriching teaching

and learning. At the same time, technology is seen as offering a novel form of instrumenting assessment and testing procedures.

The Engineering Archetype

The Engineering archetype came into being with the advent of programmed instruction. It was assisted by the application of behavioristic technology to the problems of teaching and learning, as a result of the influence of Professor B. F. Skinner in the late 1950s. Operant conditioning and the shaping of human behavior became part of a radically new technology of education and training. It also generated a good deal of emotion for and against educational technology itself.

A great deal of the initial effort which has been expended within this paradigm has involved comparing the respective performance of one method with another. Teachers, for instance, were compared with programmed texts, behaviorally-stated objectives with more generally-stated objectives, and goal-centered evaluation with goal-free evaluation. In this way, the advantages and disadvantages of each of the options were assessed in an attempt to identify the best way to go. The metaphor, in each case, is that of a slot-car race, in which one car is raced against another in order to see who wins.

The underlying paradigm in instructional development is usually captured by a flow diagram of one sort or another. More often than not, the diagram consists of a series of boxes and arrows, with a feedback loop, indicating a step-by-step approach to design, development, implementation and evaluation. Almost always, ends are defined before means. A systematic approach is belabored as the only way to go, and each step is perceived as almost being a self-contained activity. Unlike the Audio-Visual archetype, the Engineering one appears to be heavily mechanistic in its underlying orientation.

The Problem-Solving Archetype

The Problem-Solving archetype began to be adopted around 1973 or 1974. Although it is still not characteristic of the everyday activities of the majority of instructional developers, it is fast becoming an alternative way of seeing things. The associated metaphor is that of a chess game, in which players engage in a demanding intellectual activity. There is no one best set of moves, no one way of going. Intense concentration, ability to foresee the consequences of current actions, flexibility, and acquired skill and experience are all essential prerequisites to efficiency and effectiveness. So it is with instructional development.

In education and training, some sort of dissatisfaction should preface developmental activities, according to this archetype. The overall goal is to obtain some state of satisfaction in terms of human performance. The aim, as it were, is to reduce the probability of error (Davies,

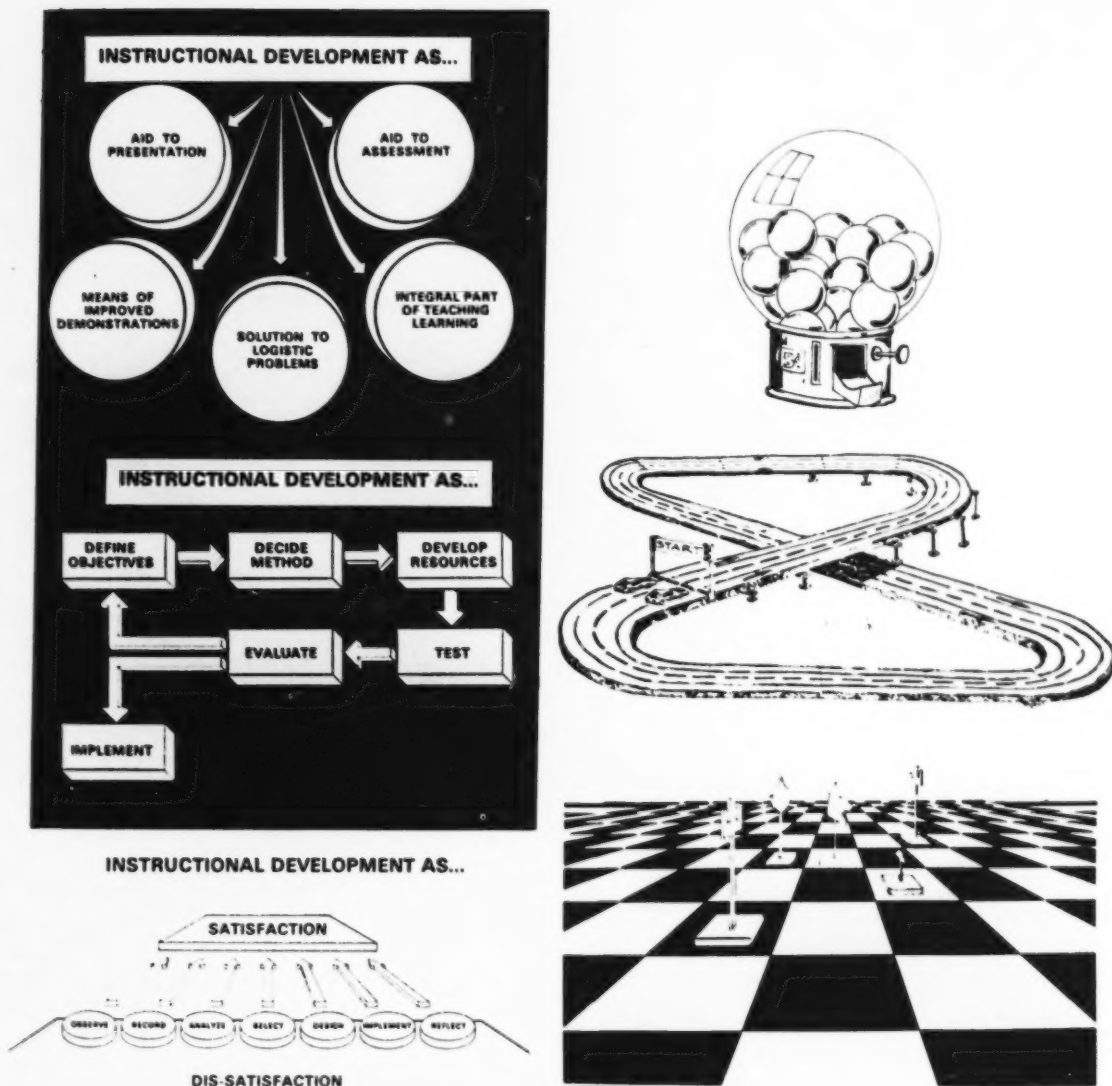


Figure 2-2. Instructional Development: archetypes and paradigms.

1981c). In order to accomplish this, an instructional developer brings to the situation a range of technologies. Observation, analysis, synthesis, reflection and design capture some of the skills. There are, however, many more. The order and manner in which they are used depends upon the character of the problem situation and the aim in mind. There is no one best way. Rarely is there an ideal solution, at least in the majority of cases. Everything depends upon the situation, the problem and the perceived way of tackling it, as well as upon the individual styles of the people involved.

Four Classes of Problems

Generally speaking, four broad classes of problems can be recognized in the work of instruc-

tional developers. Each class of problems is associated with a set of typical ways of tackling them. The four classes of ID problems can be identified as:

- Problems of deviation.
- Problems of improvement or renewal.
- Problems of prediction.
- Problems of acceptance.

Each requires developers to respond in rather different ways.

Problems of deviation occur when there is a gap or deviation from some known standard. The

gap should be of sufficient magnitude to warrant corrective action, otherwise the effort involved in producing the correction is wasted. Examples of this type of problem occur when people's performance in language or number skills is below a desired norm. In industry, evidence of problems of deviation is seen when people are unable to perform their job at a required level of adequacy. Such deviations from what is required are usually the product of deficiency in knowledge, skill or attitude.

Problems of improvement or renewal are basically involved in situations in which there is a perceived need to bring about some change in performance. Often these arise, less from a lack of knowledge, skill or attitude, and more from not wishing to perform at the desired level. Sometimes it is a problem of motivation, sometimes of supervision. More usually, the problem arises from poor communication, or simply an absence of feedback. Poorly designed tasks or tools also share their part of the blame. Regardless of cause, tackling the problem necessitates bringing about an improvement or renewal in performance.

Problems of prediction are gradually becoming more and more frequent in the experience of instructional developers. They generally involve situations in which there is a need to anticipate emerging or future changes in society, in the economy or in technology. An example of this might be found in industry, where the development of a new process entails retraining workers to operate a plant before it is even constructed. Predicting training needs in such a situation is a demanding task. It involves carrying out a task analysis before the task exists for observation. However, the weight of the evidence is very strongly in favor of such techniques, and work in the area of problem-prediction is occurring more and more. Indeed, Indiana University has become a center for working with such problems.

Problems of acceptance are commonplace. The problems associated with dealing with planned change are everywhere. Indeed, the diffusion and adoption of new ideas and methods of doing things constantly beset education and training. Although a wide range of strategies and tactics are available to instructional developers, resistance to change and sheer inertia often present seemingly insuperable barriers. Overcoming these is no mean task, and instructional developers are intimately involved in their solution.

THE NATURE OF INSTRUCTIONAL DEVELOPMENT

Despite the themata, and despite the archetypes and paradigms available to developers, instructional development is not a concept which can be clearly defined. It is not an easy thing to pin down, or even to describe and explain. The simpler the description, the more obvious the concept becomes; the more complex the description, the more bewildering it becomes. Instructional development is not a concept like mechanics. It is

more like liberty, to which, in fact, it is somewhat related.

As a concept, instructional development refers to no particular process. The activities and techniques of instructional development, as we have seen, better describe the technology available. They do not define ID itself, although they have an essential role within it. Rather the term instructional development:

encapsulates criteria to which each one of the technologies must contribute and to which the final product must conform in some meaningful manner.

To say that instructional development is not a process, but is a set of criteria, highlights the fact that there are certain standards to maintain (see Davies, 1981b).

Although developmental projects vary, and problems change, the criteria are unchanging and demanding. They ask, both in terms of the short-term as well as the long-term, a series of questions. These include:

- Are the end results (sensitivities, values, attitudes, skills and knowledge) worthwhile? The experiences should certainly be relevant and capable of justification.
- Have the understandings, attitudes and skills essential to mastery been acquired? Knack, simple technique, and basic knowledge are insufficient to produce worthy performance.
- Have the learnings been integrated into people's lives, so that reliable performance is achieved? Learners should actively portray standards, skills and thoughts.
- Has the experience been a motivating and joyous one for everyone taking part? Learners and developers should both feel a sense of achievement and personal involvement.

Instructional development, in terms of how it is done, can be different things to different people. It can be cold, clinical and sterile; it can be warm, exciting and imaginative. It can be an art, a craft or a science; mechanistic for some, dynamic for others. Regardless of how it is carried out, however, the game is the same. Criteria are involved, and problems await solution.

CONCLUSION

Although developers define their field differently, methodology in its wide-ranging variety contributes to the integrity of the field. Running through the literature are a series of themes or

themata, which have a strong hold over the minds of developers regardless of the theories to which they subscribe. Although they are still used as a basis for decision-making, greater appeal is now being made to more general theory and empirical findings. Such a change suggests that instructional development is now reaching a stage of maturity.

Cutting across the basic themata are three contrasting archetypes, each with a set of related paradigms for action. The Audio-Visual origins of the field are, at last, being placed in their historical perspective, and the engineering archetype is gradually being rejected in favor of the problem-solving metaphor. It is now generally recognized that there is "no one best way." Skepticism and dogmatism have largely had their day, and for the instructional developer, as for Kant in his *Critique of Pure Reason*, "the critical path is alone open." (Kant, 1781). Reflection, criticism and evaluation are the bonds which hold the technologies together. They, alone, deal with the question of appropriateness.

Instructional development is not a process. The tools and techniques of ID no more describe instructional development than the tools and techniques of the carpenter describe carpentry. The concept is not an easy one to tie down, but in essence it encapsulates a set of criteria to which the technologies must contribute, and the final product conform. Regardless of what is done, criteria is the name of the game when problems demand solution.

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